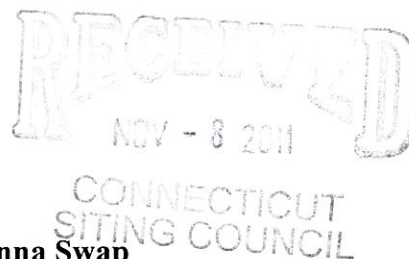


280 Trumbull Street
Hartford, CT 06103-3597
Main (860) 275-8200
Fax (860) 275-8299
kbaldwin@rc.com
Direct (860) 275-8345

ORIGINAL

November 3, 2011

Linda Roberts
Executive Director
Connecticut Siting Council
10 Franklin Square
New Britain, CT 06051



Re: **Notice of Exempt Modification – Antenna Swap**
347 Three Mile Road, Glastonbury, Connecticut

Dear Ms. Roberts:

Cellco Partnership d/b/a Verizon Wireless (“Cellco”) currently maintains wireless telecommunications antennas at the 148-foot level on the existing 150-foot tower at the above-referenced address. The tower is owned by Crown Castle. The Council approved Cellco’s shared use of the existing tower in 1996. Cellco now intends to modify its installation by replacing twelve (12) of its existing antennas with four (4) model SC-E 6014 rev2 cellular antennas; two (2) model LPA-80063/6CF cellular antennas; three (3) model BXA-171063-8BF PCS antennas; two (2) SLCP 2X6014 LTE antennas; and one (1) model BXA-70063/6CF LTE antenna, all at the same 148-foot level on the tower. Cellco also intends to install six (6) coax cable diplexers on its antenna platform. Attached behind Tab 1 are the specifications for the proposed replacement antennas and cable diplexers.

Please accept this letter as notification pursuant to R.C.S.A. § 16-50j-73, for construction that constitutes an exempt modification pursuant to R.C.S.A. § 16-50j-72(b)(2). In accordance with R.C.S.A. § 16-50j-73, a copy of this letter is being sent to Richard J. Johnson, Town Manager of the Town of Glastonbury. A copy of this letter is also being sent to Josephine I. Flanagan, Trustee, the owner of the property on which the tower is located.

The planned modifications to the facility fall squarely within those activities explicitly provided for in R.C.S.A. § 16-50j-72(b)(2).



Law Offices

BOSTON

PROVIDENCE

HARTFORD

NEW LONDON

STAMFORD

WHITE PLAINS

NEW YORK CITY

ALBANY

SARASOTA

www.rc.com

11314367-v1

ROBINSON & COLE^{LLP}

Linda Roberts
November 3, 2011
Page 2

1. The proposed modifications will not result in an increase in the overall height of the existing tower. Cellco's antennas and diplexers will be located at the same 148-foot level on the existing 150-foot tower.

2. The proposed modifications will not involve any modifications to ground-mounted equipment and, therefore, will not require the extension of the site boundaries.

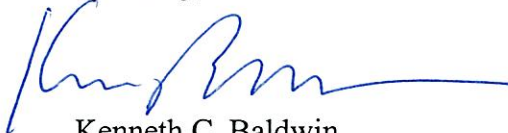
3. The proposed modifications will not increase noise levels at the facility by six decibels or more.

4. The operation of the replacement antennas will not increase radio frequency (RF) power density levels at the facility to a level at or above the Federal Communications Commission (FCC) adopted safety standard. A cumulative power density table for Cellco's modified facility is included behind Tab 2.

Also attached is a Structural Analysis Report confirming that the tower and foundation can support Cellco's proposed antennas modification. (See Tab 3).

For the foregoing reasons, Cellco respectfully submits that the proposed modifications to the above-referenced telecommunications facility constitutes an exempt modification under R.C.S.A. § 16-50j-72(b)(2).

Sincerely,



Kenneth C. Baldwin

Enclosures

Copy to:

Richard J. Johnson, Glastonbury Town Manger
Josephine I. Flanagan, Trustee
Sandy M. Carter

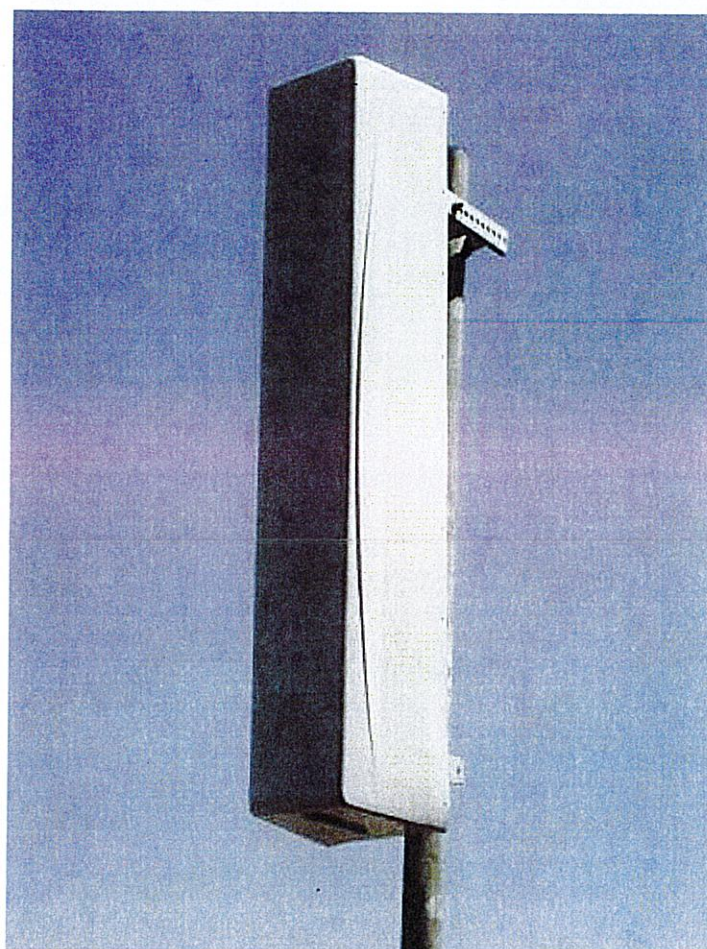


SC-E 6014 rev2

Enhanced 800 - 960 MHz log-periodic antenna

Features

- ☐ Small size
- ☐ Aesthetically pleasing
- ☐ Suitable for TDMA/CDMA/GSM/3G
- ☐ High return loss
- ☐ Low intermodulation
- ☐ High front-to-back ratio
- ☐ Outstanding performance over the entire band (800 - 960 MHz)
- ☐ Upper side-lobe suppression
- ☐ Rugged design
- ☐ Dramatically improved signal to interference performance



Electrical specifications

Frequency range:	800-960 MHz
Impedance:	50 ohm
Connector type:	7/16 Din
Return loss:	20 dB
Polarization:	Vertical
Gain:	14 dBd
Front-to-back ratio:	> 30 dB
Upper side-lobe suppression:	18 dB

Intermodulation (2x20W):	IM5	160 dB
	IM7/9	170 dB

Power rating:	500 W
H-plane (-3 dB point):	54 - 60°
V-plane (-3 dB point):	16 - 18°
Lightning protection:	DC grounded

Mechanical specifications

Overall height:	43 in	[1092 mm]
Width:	8.5 in	[216 mm]
Depth:	8 in	[203 mm]
Weight (excluding brackets):	15 lbs	[6.8 Kg]
Wind load measured up to:	150 mph	[240 Km/h]
Wind area (side of antenna):	2.54 sq. ft.	[0.24 sq.m]
Lateral thrust At 113 mph/ 180Km/h (worst case):	122 lbs	[577 N]

Materials

Radiating Elements:	Aluminum
Transformer (Power distribution)	Ceramic PCB
Chassis:	Aluminum
Radome:	Grey Fiberglass/PVC
Tilt-bracket:	Hot dip galvanized steel
Mounting bolts:	Stainless steel

The SC-E 6014 rev2 is made in the U.S.A.

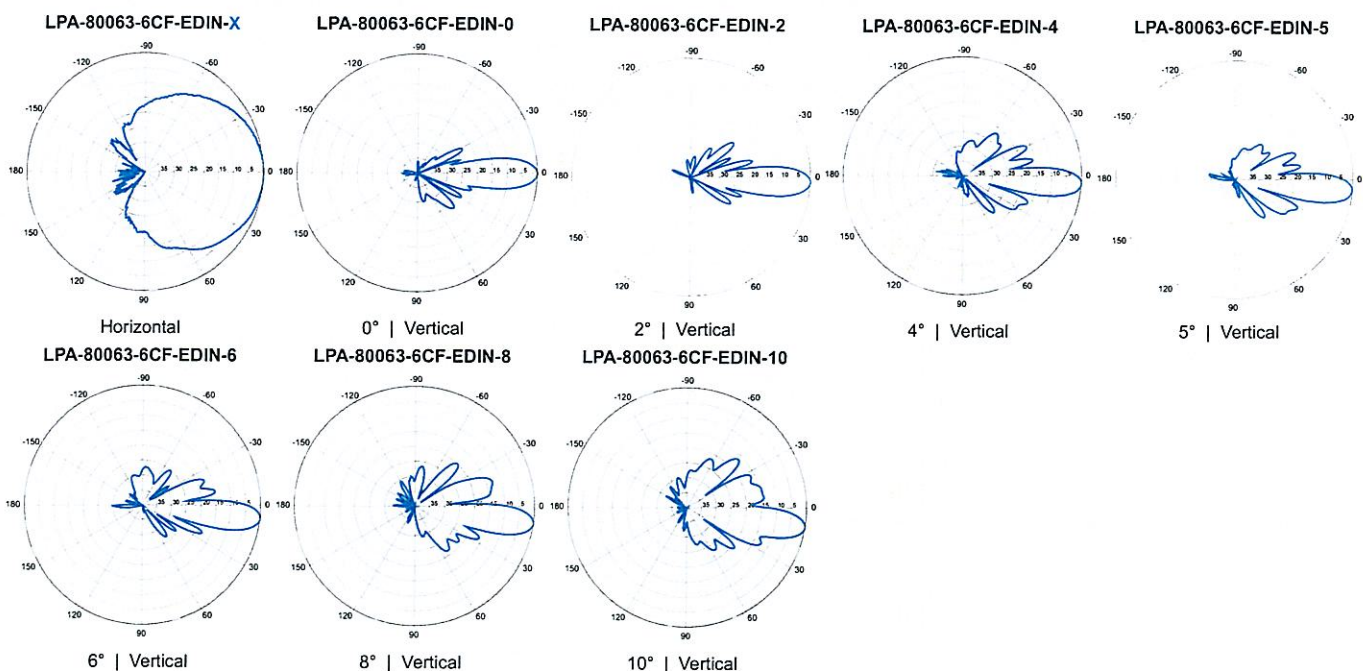
LPA-80063-6CF-EDIN-X

V-Pol | Log Periodic | 63° | 14.5 dBd

Replace "X" with desired electrical downtilt.

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

Electrical Characteristics	
Frequency bands	806-960 MHz
Polarization	Vertical
Horizontal beamwidth	63°
Vertical beamwidth	10°
Gain	14.5 dBd (16.6 dBi)
Electrical downtilt (X)	0, 2, 4, 5, 6, 8, 10
Impedance	50Ω
VSWR	≤1.4:1
Null fill	5% (-26.02 dB)
Input power	500 W
Lightning protection	Direct Ground
Connector(s)	1 Port / EDIN or NE / Female / Center (Back)
Mechanical Characteristics	
Dimensions Length x Width x Depth	1805 x 385 x 332 mm 71.1 x 15.2 x 13.1 in
Depth of antenna with z-bracket	372 mm 14.6 in
Weight without mounting brackets	12.3 kg 27 lbs
Survival wind speed	> 201 km/hr > 125 mph
Wind area	Front: 0.70 m ² Side: 0.59 m ² Front: 7.5 ft ² Side: 6.3 ft ²
Wind load @ 161 km/hr (100 mph)	Front: 885 N Side: 757 N Front: 199 lbf Side: 170 lbf
Mounting Options	
3-Point Mounting & Downtilt Bracket Kit (0-20°)	Part Number 21700000 Fits Pipe Diameter 50-102 mm 2.0-4.0 in Weight 11 kg 25 lbs
Lock-Down Brace	If the lock-down brace is used, the maximum diameter of the mounting pipe is 88.9 mm or 3.5 in.



Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171063-8BF-EDIN-X

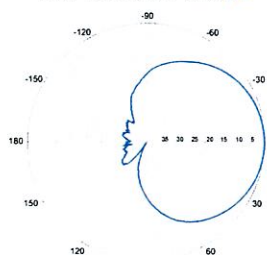
Replace "X" with desired electrical downtilt.

X-Pol | FET Panel | 63° | 17.4 dBi

Electrical Characteristics	1710-2170 MHz		
Frequency bands	1710-1880 MHz	1850-1990 MHz	1920-2170 MHz
Polarization	±45°	±45°	±45°
Horizontal beamwidth	68°	65°	60°
Vertical beamwidth	7°	7°	7°
Gain	14.5 dBd / 16.6 dBi	14.9 dBd / 17.0 dBi	15.3 dBd / 17.4 dBi
Electrical downtilt (X)	0, 2, 4, 8		
Impedance	50Ω		
VSWR	≤1.5:1		
First upper sidelobe	< -17 dB		
Front-to-back isolation	> 30 dB		
In-band isolation	> 28 dB		
IM3 (20W carrier)	< -150 dBc		
Input power	300 W		
Lightning protection	Direct Ground		
Connector(s)	2 Ports / EDIN / Female / Bottom		
Operating temperature	-40° to +60° C / -40° to +140° F		
Mechanical Characteristics			
Dimensions Length x Width x Depth	1232 x 154 x 105 mm	48.5 x 6.1 x 4.1 in	
Depth with I-brackets	133 mm	5.2 in	
Weight without mounting brackets	4.8 kg	10.5 lbs	
Survival wind speed	296 km/hr	184 mph	
Wind area	Front: 0.19 m ² Side: 0.14 m ²	Front: 2.0 ft ² Side: 1.5 ft ²	
Wind load @ 161 km/hr (100 mph)	Front: 281 N Side: 223 N	Front: 63 lbf Side: 50 lbf	
Mounting Options	Part Number	Fits Pipe Diameter	Weight
2-Point Mounting Bracket Kit	26799997	50-102 mm 2.0-4.0 in	2.3 kg 5 lbs
2-Point Mounting & Downtilt Bracket Kit	26799999	50-102 mm 2.0-4.0 in	3.6 kg 8 lbs
Concealment Configurations	For concealment configurations, order BXA-171063-8BF-EDIN-X-FP		

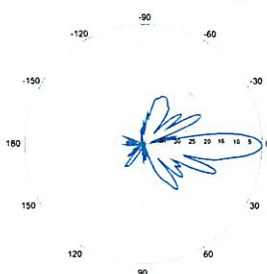


BXA-171063-8BF-EDIN-X



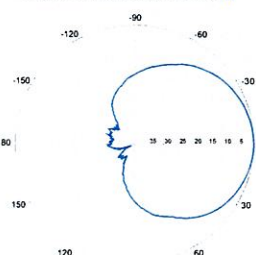
Horizontal | 1710-1880 MHz

BXA-171063-8BF-EDIN-0



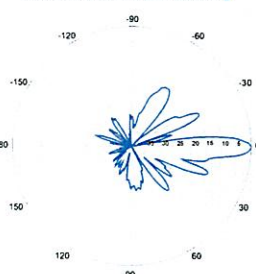
0° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-X



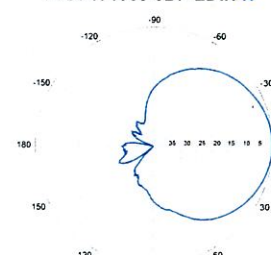
Horizontal | 1850-1990 MHz

BXA-171063-8BF-EDIN-0



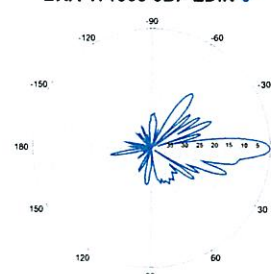
0° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-X



Horizontal | 1920-2170 MHz

BXA-171063-8BF-EDIN-0



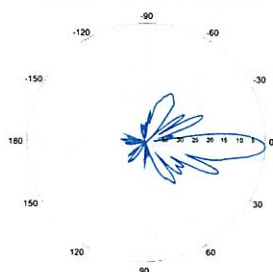
0° | Vertical | 1920-2170 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-171063-8BF-EDIN-X

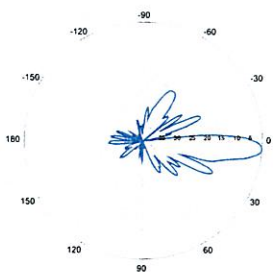
X-Pol | FET Panel | 63° | 17.4 dBi

BXA-171063-8BF-EDIN-2



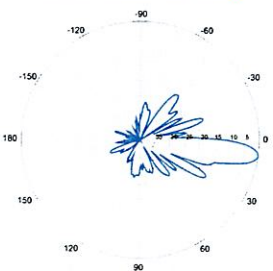
2° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-4



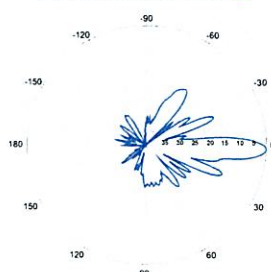
4° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-8



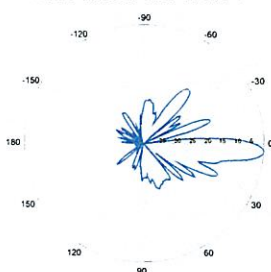
8° | Vertical | 1710-1880 MHz

BXA-171063-8BF-EDIN-2



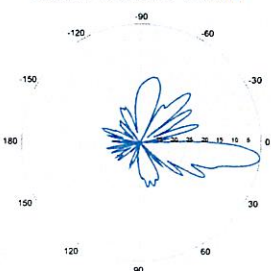
2° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-4



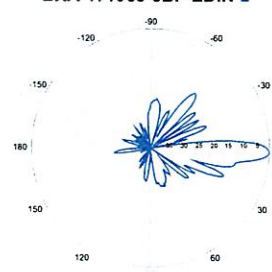
4° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-8



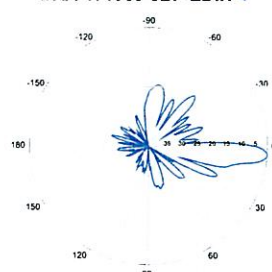
8° | Vertical | 1850-1990 MHz

BXA-171063-8BF-EDIN-2



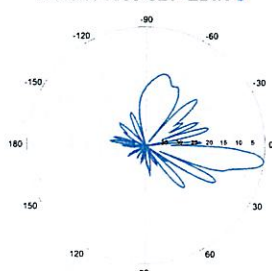
2° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-4



4° | Vertical | 1920-2170 MHz

BXA-171063-8BF-EDIN-8



8° | Vertical | 1920-2170 MHz

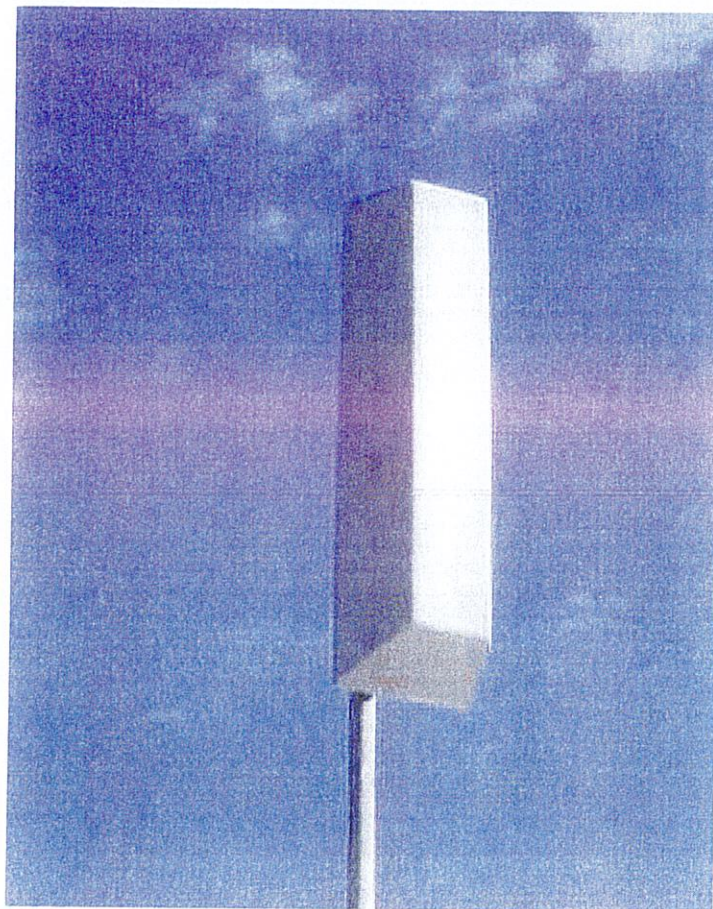
Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

SLCP 2x6014

Dual (2x) Circularly Polarized log-periodic antenna

Features

- ☐ Transmit Diversity Gain
- ☐ Can be configured to combine space & polarization diversity
- ☐ Outstanding performance over the entire band (700 - 800 MHz)
- ☐ Excellent Axial Ratio
- ☐ Optimized for 4G & 3G systems
- ☐ Low intermodulation
- ☐ Improved Side-to-side rejection
- ☐ Fading reduction
- ☐ Excellent isolation between ports



Electrical specifications

Frequency range:	700-800 MHz	
Impedance:	50 ohm	
Connector type:	7/16 Din	
Return loss:	18 dB	
Polarization:	Circular	
Gain ea. port [Circular]:	2x14 dBdC	
Gain ea. port [Linear]:	2x11 dBdL	
Axial Ratio:	2 dB	
Isolation between ports (TX band):	30 dB	
Front-to-back ratio:	30 dB	
Intermodulation (2x20W):	IM3	150 dB
	IM5	160 dB
	IM7/9	170 dB
Power rating:	2x 500 W	
H-plane (-3 dB point):	2x 55°	
V-plane (-3 dB point):	2x 16°	
Lightning protection:	DC grounded	

Mechanical specifications

Overall height:	53 in	[1346 mm]
Width:	14 in	[356 mm]
Depth:	11 in	[279 mm]
Weight (excluding brackets):	20 lbs	[9 Kg]
Wind load measured up to:	150 mph	[240 Km/h]
Wind area (side of antenna):	5.15 sq. ft.	[0.48 sq.m]
Lateral thrust at 113 mph/ 180 Km/h (worst case):	263 lbs	[1171 N]

Materials

Radiating Elements:	Aluminum
Transformer (Power distribution)	Ceramic PCB
Chassis:	Aluminum
Radome:	Grey Fiberglass/PVC
Mounting bolts:	Stainless steel

The SLCP 2x6014 is made in the U.S.A.

BXA-70063-6CF-EDIN-X

X-Pol | FET Panel | 63° | 14.5 dBd

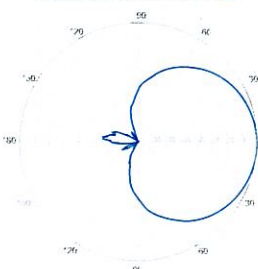
Replace "X" with desired electrical downtilt

Antenna is also available with NE connector(s). Replace "EDIN" with "NE" in the model number when ordering.

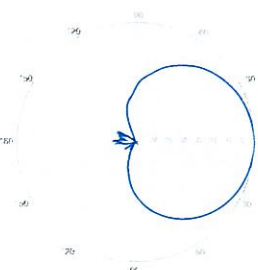
Electrical Characteristics	696-900 MHz			
Frequency bands	696-806 MHz		806-900 MHz	
Polarization	±45°			
Horizontal beamwidth	65°		63°	
Vertical beamwidth	13°		11°	
Gain	14.0 dBd (16.1 dBi)		14.5 dBd (16.6 dBi)	
Electrical downtilt (X)	0, 2, 3, 4, 5, 6, 8, 10			
Impedance	50Ω			
VSWR	≤1.35:1			
Upper sidelobe suppression (0°)	-18.3 dB		-18.2 dB	
Front-to-back ratio (+/-30°)	-33.4 dB		-36.3 dB	
Null fill	5% (-26.02 dB)			
Isolation between ports	< -25 dB			
Input power with EDIN connectors	500 W			
Input power with NE connectors	300 W			
Lightning protection	Direct Ground			
Connector(s)	2 Ports / EDIN or NE / Female / Center (Back)			
Mechanical Characteristics				
Dimensions Length x Width x Depth	1804 x 285 x 132 mm		71.0 x 11.2 x 5.2 in	
Depth with z-brackets	172 mm		6.8 in	
Weight without mounting brackets	7.9 kg		17 lbs	
Survival wind speed	> 201 km/hr		> 125 mph	
Wind area	Front: 0.51 m ²	Side: 0.24 m ²	Front: 5.5 ft ²	Side: 2.6 ft ²
Wind load @ 161 km/hr (100 mph)	Front: 759 N	Side: 391 N	Front: 169 lbf	Side: 89 lbf
Mounting Options	Part Number	Fits Pipe Diameter		Weight
3-Point Mounting Bracket Kit	36210003	50-160 mm	2.0-6.3 in	6.3 kg 14 lbs
3-Point Downtilt Bracket Kit (0-14°)	36210004	50-160 mm	2.0-6.3 in	7.3 kg 16 lbs
Downtilt Mounting Applications	A mounting bracket and downtilt bracket kit must be ordered for downtilt applications			
Concealment Configurations	For concealment configurations, order BXA-70063-6CF-EDIN-X-FP			



BXA-70063-6CF-EDIN-X

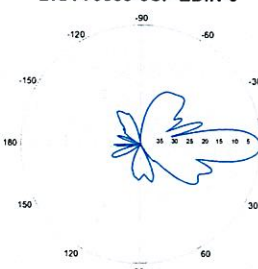


Horizontal | 750 MHz

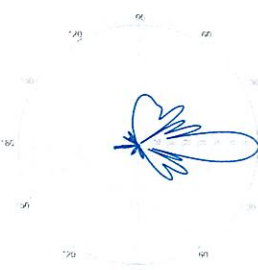


Horizontal | 850 MHz

BXA-70063-6CF-EDIN-0

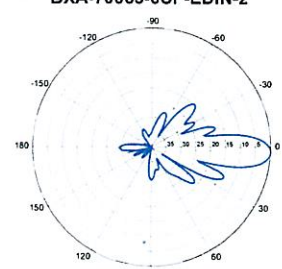


0° | Vertical | 750 MHz

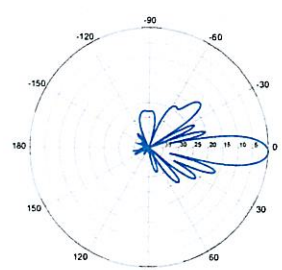


0° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-2



2° | Vertical | 750 MHz



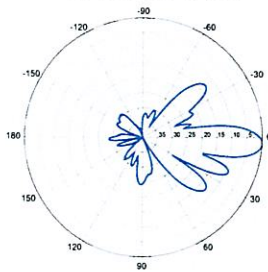
2° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.

BXA-70063-6CF-EDIN-X

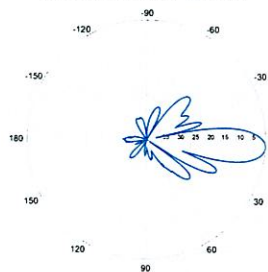
X-Pol | FET Panel | 63° | 14.5 dBd

BXA-70063-6CF-EDIN-3



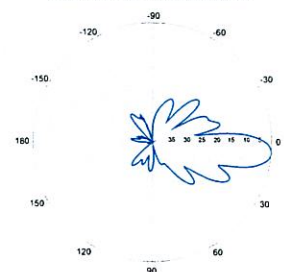
3° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-4

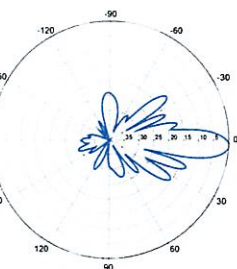


4° | Vertical | 750 MHz

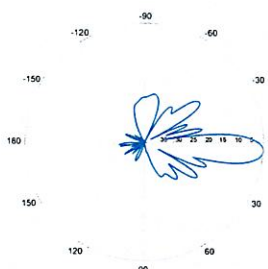
BXA-70063-6CF-EDIN-5



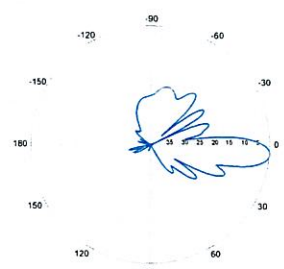
5° | Vertical | 750 MHz



3° | Vertical | 850 MHz

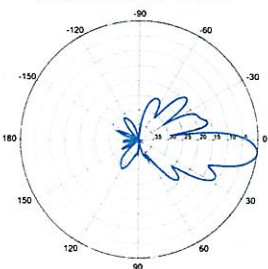


4° | Vertical | 850 MHz



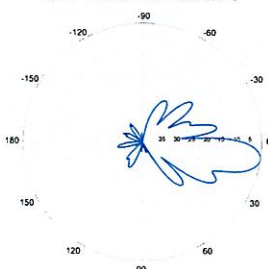
5° | Vertical | 850 MHz

BXA-70063-6CF-EDIN-6



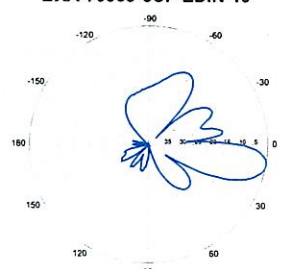
6° | Vertical | 750 MHz

BXA-70063-6CF-EDIN-8

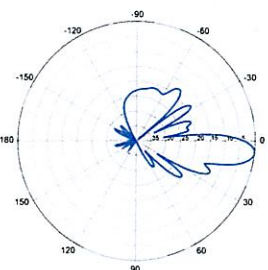


8° | Vertical | 750 MHz

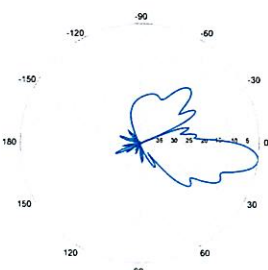
BXA-70063-6CF-EDIN-10



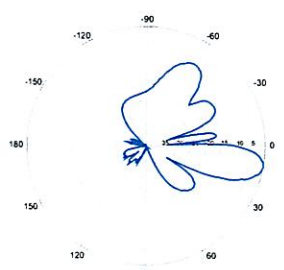
10° | Vertical | 750 MHz



6° | Vertical | 850 MHz



8° | Vertical | 850 MHz



10° | Vertical | 850 MHz

Quoted performance parameters are provided to offer typical or range values only and may vary as a result of normal manufacturing and operational conditions. Extreme operational conditions and/or stress on structural supports is beyond our control. Such conditions may result in damage to this product. Improvements to product may be made without notice.



ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Product Description

The ShareLite FD9R6004 Series of diplexers are designed to enable feeder sharing between systems in the 698-960 MHz range and in the 1710-2200 MHz range. The diplexer is equipped with in-line connector placement so it can be installed in the BTS cabinet or at the tower top. This is especially valuable in crowded sites or when the feeders are not easily accessible. Due to its wideband design, the FD9R6004 Series can accommodate many combining solutions between 698-960 MHz and 1710-2200 MHz systems such as LTE 700 MHz, Cellular 800 MHz with PCS, GSM900 with GSM1800, or GSM900 with UMTS. This diplexer features a highly selective filter. It provides a high level of isolation between ports, while keeping the insertion loss on both paths at an extremely low level. The FD9R6004 diplexers are available with various DC pass options, helpful in configurations with or without the Tower Mount Amplifiers installed.



Features/Benefits

- LTE ready design
- Extremely Low Insertion Loss
- High level of Rejection between bands – Protection against interferences
- Extremely High Power Handling Capability
- Integrated DC block/bypass versions available
- Very compact & small size design – Easy installation and reduced tower load
- In-line long-neck connectors for easy connection & waterproofing
- Exceptional reliability & environmental protection (IP 67)
- Equipped with 1 * Breathable Vent – Prevent any humidity inside the product
- Mounting hardware for Wall and Pole mount provided (P/N SEM2-1A)
- Grounding already provided through the mounting bracket
- Kit available for easy dual mount

Technical Specifications

Product Type	Diplexer/Cross Band Coupler
Frequency Range 1, MHz	698-960
Frequency Range 2, MHz	1710-2200
Application	LTE700, GSM900, UMTS, GSM1800, Cellular 800, PCS
Configuration	Sharelite Single diplexer, outdoor, DC pass in the 1710-2170MHz path, with mounting hardware SEM2-1A
Mounting	Wall Mounting: With 4 screws (maximum 6mm diameter); Pole Mounting: With included clamp set 40-110mm (1.57-4.33)
Return Loss All Ports Min/Typ, dB	19/23
Power Handling Continuous, Max, W	1250 at common port; 750 in low frequency path & 500 in high frequency path
Power Handling Peak, Max, W	15000 in low frequency path & 8000 in high frequency path
Impedance, Ohms	50
Insertion Loss, Path 1, dB	0.07 typ.
Insertion Loss, Path 2, dB	0.13 typ.
Rejection Between Bands Min/Typ, dB	58/64@698-960MHz; 60/70@1710-2200MHz
IMP Level at the COM Port, Typ, dBm	-112 @ 2x43
DC Pass in Low Frequency Path	No
DC Pass in High Frequency Path	Yes
Temperature Range, °C (°F)	-40 to +60 (-40 to +140)
Environmental	ETSI 300-019-2-4 Class 4.1E
Ingress Protection	IP 67
Lightning Protection	EN/IEC61000-4-5 Level 4
Connectors	In-line long-neck 7-16-Female
Weight, kg (lb)	1.2 (2.6)
Shipping Weight, kg (lb)	3.2 (7) for 2 * single units in 1 * box, 9.8 (21.6) for 6 * units = 3 * Boxes in 1 * overwrap
Dimensions, H x W x D, mm (in)	147 x 164 x 37 (5.8 x 6.5 x 1.5)
Shipping Dimensions, H x W x D, mm (in)	254 x 406 x 82 (10 x 16 x 3.2) for 2 * Single Units in 1 * box, 280 x 406 x 241 (11 x 16 x 9.5) for 6 * units = 3 * Boxes in 1 * overwrap
Volume, L	0.43
Housing	Aluminum

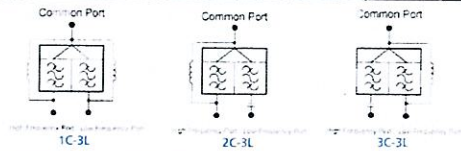
Notes

ShareLite Wideband Diplexer – In-line 698-960 MHz/1710-2200 MHz, DC pass in high frequency path

Other Documentation

FD9R6004/2C-3L Installation Instructions: Wideband_Diplexer_Installation_Rev5.pdf

Selection Guide Diplexer 698-960 / 1710-2200MHz					
	Model Number	Full DC Pass	DC Pass High Band	DC Pass Low Band	Mounting Hardware Included
Single	FD9R6004/1C-3L				X
	FD9R6004/2C-3L				X
	FD9R6004/3C-3L				X
Dual	KIT-FD9R6004/1C-DL				X
	KIT-FD9R6004/2C-DL				X
	KIT-FD9R6004/3C-DL				X



The FD9R6004 Series is upgradeable to a Dual Diplexer kit by means of 2 diplexers and mounting hardware kits SEM2-1A and SEM2-3

Mounting Hardware and Ground Cable Ordering Information

Model Number	Description	
SEM2-1A	Mounting Hardware, Pole mount ø40-110mm (Included with the Single and Dual Diplexer) Wall Screws M6 (Not included with the product)	
SEM2-3	Assembly kit for 2 pcs of FD9R6004/xC-3L (Can be ordered separately but included with the Dual Diplexer Kit)	
CA020-2	Ground Cable, 2m, includes lugs (Optional)	
CA030-2	Ground Cable, 2m, includes lugs (Optional)	
SEM6	Mounting Hardware for 6 Diplexers, Tower Base (Optional)	

General		Power	Density						
Site Name: East Glastonbury									
Tower Height: Verizon @ 148ft									
CARRIER	# OF CHAN.	WATTS ERP	HEIGHT	CALC. POWER DENS	FREQ.	MAX. PERMISS. EXP.	FRACTION MPE	Total	
*Nextel	9	100	126	0.0204	851	0.5673	3.59%		
*T-Mobile GSM	8	137	116	0.0293	1945	1.0000	2.93%		
*T-Mobile UMTS	2	770	116	0.0412	2100	1.0000	4.12%		
*Cingular UMTS	1	500	140	0.0092	880	0.5867	1.56%		
*Cingular GSM	2	296	140	0.0109	880	0.5867	1.85%		
*Cingular GSM	1	427	140	0.0078	1930	1.0000	0.78%		
*Sprint				0.0042	1900	1.0000	0.42%		
*XM Sat Radio	2	4552	99	0.3340	2337	1.0000	33.40%		
Verizon PCS	7	268	148	0.0308	1970	1.0000	3.08%		
Verizon Cellular	9	332	148	0.0490	869	0.5793	8.47%		
Verizon AWS	1	670	148	0.0110	2145	1.0000	1.10%		
Verizon 700	2	695	148	0.0228	698	0.4653	4.90%		
								66.21%	
* Source: Siting Council									

Date: September 30, 2011

Veronica Harris
Crown Castle
1200 McArthur Blvd
Mahwah, NJ 07430



Crown Castle
2000 Corporate Drive
Canonsburg, PA 15317
(724) 416-2000

Subject: Structural Analysis Report

Carrier Designation:	Verizon Wireless Co-Locate	
	Carrier Site Number:	N/A
	Carrier Site Name:	East Glastonbury, CT
Crown Castle Designation:	Crown Castle BU Number:	806368
	Crown Castle Site Name:	HRT 049B 943215
	Crown Castle JDE Job Number:	167359
	Crown Castle Work Order Number:	440146
Engineering Firm Designation:	Crown Castle Project Number:	440146
Site Data:	THREE MILE ROAD, GLASTONBURY, Hartford County, CT Latitude 41° 41' 36.93", Longitude -72° 32' 50.11" 145 Foot - Monopole Tower	

Dear Veronica Harris,

Crown Castle is pleased to submit this "Structural Analysis Report" to determine the structural integrity of the above mentioned tower. This analysis has been performed in accordance with the Crown Castle Structural 'Statement of Work' and the terms of Crown Castle Purchase Order Number 440146, in accordance with application 131495, revision 0.

The purpose of the analysis is to determine acceptability of the tower stress level. Based on our analysis we have determined the tower stress level for the structure and foundation, under the following load case, to be:

LC1: Existing + Reserved + Proposed Equipment

Sufficient Capacity

Note: See Table I and Table II for the proposed and existing/reserved loading, respectively.

The analysis has been performed in accordance with the TIA/EIA-222-F standard and local code requirements based upon a wind speed of 80 mph fastest mile.

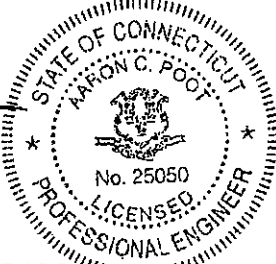
All modifications and equipment proposed in this report shall be installed in accordance with the attached drawings for the determined available structural capacity to be effective.

We at Crown Castle appreciate the opportunity of providing our continuing professional services to you and Crown Castle. If you have any questions or need further assistance on this or any other projects please give us a call.

Structural analysis prepared by: Craig Thompson, EIT / GS

Respectfully submitted by:


Aaron C. Poot, P.E.
Engineering Supervisor



RISA Tower Report - version 5.4.2.0

9/30/11

TABLE OF CONTENTS

1) INTRODUCTION

2) ANALYSIS CRITERIA

Table 1 - Proposed Antenna and Cable Information

Table 2 - Existing and Reserved Antenna and Cable Information

Table 3 - Design Antenna and Cable Information

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

3.1) Analysis Method

3.2) Assumptions

4) ANALYSIS RESULTS

Table 5 – Section Capacity (Summary)

Table 6 – Tower Component Stresses vs. Capacity

4.1) Recommendations

5) APPENDIX A

RISATower Output

6) APPENDIX B

Base Level Drawing

7) APPENDIX C

Additional Calculations

1) INTRODUCTION

This tower is a 145 ft Monopole tower designed by ENGINEERED ENDEAVORS, INC. in January of 1997. The tower was originally designed for a wind speed of 90 mph per TIA/EIA-222-F. The base plate was modified by GPD in March 2005.

2) ANALYSIS CRITERIA

The structural analysis was performed for this tower in accordance with the requirements of TIA/EIA-222-F Structural Standards for Steel Antenna Towers and Antenna Supporting Structures using a fastest mile wind speed of 80 mph with no ice, 37.6 mph with 1 inch ice thickness and 50 mph under service loads.

Table 1 - Proposed Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
145	148	3	antel	BXA-171063-8BF-2 w/ Mount Pipe			
		1	antel	BXA-70063-6CF-EDIN-6 w/ Mount Pipe			
		2	antel	LPA-80063/6CF w/ Mount Pipe	-	-	-
		6	rfs celwave	FD9R6004/2C-3L			
		4	swedcom	SC-E 6014 rev2 w/ Mount Pipe			
		2	swedcom	SLCP 2x6014 w/ Mount Pipe			

Table 2 - Existing and Reserved Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
145	150	1	unknown	GPS	1	1/2	1
	148	2	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD			
		2	andrew	850/1900 DUAL BAND TMA	-	-	3
		2	andrew	DB846F65ZAXY w/ Mount Pipe			
		4	antel	LPD-6513 w/ Mount Pipe			
		12	mla	MLA_ ANTENNA w/ Mount Pipe	-	-	2
		6	decibel	948F65T2ZE-M w/ Mount Pipe	-	-	3
	145	1	tower mounts	Platform Mount [LP 1001-1]	12	1-5/8	1

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)	Note
136	140	6	adc	DUAL BAND 800/1900 FULL BAND MASTHEAD			
		6	css	DUO1417-8686 w/ Mount Pipe			
		3	powerwave technologies	7770.00 w/ Mount Pipe	12	1-1/4	1
		6	powerwave technologies	LGP13519			
126	136	1	tower mounts	Platform Mount [LP 1001-1]			
	130	2	unknown	GPS			
	128	12	swedcom	ALP 9212-N w/ Mount Pipe	12 2	1-1/4 1/2	1
	126	1	tower mounts	Platform Mount [LP 601-1]			
116	117	3	andrew	RR90-17-02DPL2 w/ Mount Pipe	6	1-5/8	1
		3	rfs celwave	APX16DWV-16DWV-S-E-A20 w/Mount Pipe	6	1-5/8	5
		3	rfs celwave	ATMAA1412D-1A20			
	116	1	rfs celwave	ATMPP1412D-1CWA			
		1	tower mounts	Platform Mount [LP 601-1]	-	-	1
95	97	1	ems wireless	RR65-18-02DP w/ Mount Pipe			
	96	1	repeater technologies	DA1900-39	3	1-1/4	1
	95	2	tower mounts	Side Arm Mount [SO 701-1]			
87	87	-	-	-	6	1-1/4	3
		3	allgon	7250.02 w/ Mount Pipe	-	-	4

Notes:

- 1) Existing Equipment
- 2) MLA Equipment Does not Control; was not considered in analysis
- 3) Existing Equipment to be Removed
- 4) Abandoned Equipment to be Removed; was not considered in this analysis
- 5) Reserved Equipment

Table 3 - Design Antenna and Cable Information

Mounting Level (ft)	Center Line Elevation (ft)	Number of Antennas	Antenna Manufacturer	Antenna Model	Number of Feed Lines	Feed Line Size (in)
145	145	15	Swedcom	ALP 9212	-	-
140	140	15	Swedcom	ALP 11011	-	-
130	130	15	Swedcom	ALP 9212	-	-

3) ANALYSIS PROCEDURE

Table 4 - Documents Provided

Document	Remarks	Reference	Source
4-GEOTECHNICAL REPORTS	Dr. Clarence Welti, P.C.	262197	CCISITES
4-POST-MODIFICATION INSPECTION	GPD Associates	1090825	CCISITES
4-TOWER FOUNDATION DRAWINGS/DESIGN/SPECS	Engineered Endeavors Inc.	974245	CCISITES
4-TOWER MANUFACTURER DRAWINGS	Engineered Endeavors Inc.	262188	CCISITES
4-TOWER REINFORCEMENT DESIGN/DRAWINGS/DATA	GPD Associates	1037241	CCISITES

3.1) Analysis Method

RISATower (version 5.4.2.0), a commercially available analysis software package, was used to create a three-dimensional model of the tower and calculate member stresses for various loading cases. Selected output from the analysis is included in Appendix A.

3.2) Assumptions

- 1) Tower and structures were built in accordance with the manufacturer's specifications.
- 2) The tower and structures have been maintained in accordance with the manufacturer's specification.
- 3) The configuration of antennas, transmission cables, mounts and other appurtenances are as specified in Tables 1 and 2 and the referenced drawings.
- 4) When applicable, transmission cables are considered as structural components for calculating wind loads as allowed by TIA/EIA-222-F.

This analysis may be affected if any assumptions are not valid or have been made in error. Crown Castle should be notified to determine the effect on the structural integrity of the tower.

4) ANALYSIS RESULTS

Table 5 - Section Capacity (Summary)

Section No.	Elevation (ft)	Component Type	Size	Critical Element	P (K)	SF*P_allow (K)	% Capacity	Pass / Fail
L1	145 - 92.5	Pole	TP35.64x20.5x0.344	1	-15.352	1948.086	57.6	Pass
L2	92.5 - 44.71	Pole	TP48.61x33.511x0.438	2	-27.364	3390.152	63.5	Pass
L3	44.71 - 0	Pole	TP60.5x45.853x0.469	3	-45.529	4563.485	67.9	Pass
Summary:								
Pole (L3)							67.9	Pass
Rating =							67.9	Pass

Table 6 - Tower Component Stresses vs. Capacity - LC1

Notes	Component	Elevation (ft)	% Capacity	Pass / Fail
1	Anchor Rods	0	64.4	Pass
1	Base Plate	0	76.9	Pass
1,2	Base Foundation (Compared w/ Design Loads)	0	74.6	Pass
Structure Rating (max from all components) =				76.9%

Notes:

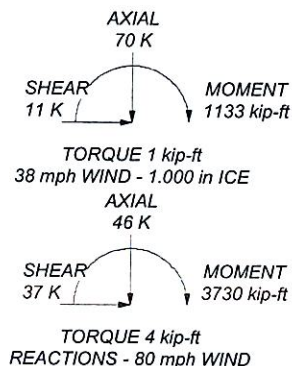
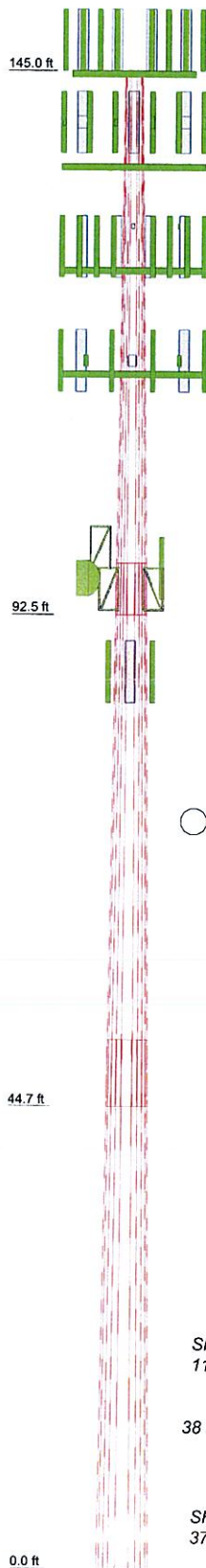
- 1) See additional documentation in "Appendix C – Additional Calculations" for calculations supporting the % capacity consumed.
- 2) Foundation capacity determined by comparing analysis reactions to original design reactions.

4.1) Recommendations

The tower and foundation have sufficient capacity to carry the existing, reserved, and proposed loading. No modifications are required at this time.

APPENDIX A
RISA TOWER OUTPUT

Section	1	2	3
Length (ft)	52.500	52.790	51.290
Number of Sides	12	12	12
Thickness (in)	0.344	0.438	0.469
Socket Length (ft)	5.000	6.580	45.853
Top Dia (in)	20.500	33.511	60.500
Bot Dia (in)	35.640	48.610	13.9
Grade	5.5	10.3	13.9
Weight (K)			29.6



DESIGNED APPURTENANCE LOADING

TYPE	ELEVATION	TYPE	ELEVATION
GPS	145	GPS	126
BXA-171063-8BF-2 w/ Mount Pipe	145	(4) ALP 9212-N w/ Mount Pipe	126
(2) FD9R6004/2C-3L	145	GPS	126
(2) SC-E 6014 rev2 w/ Mount Pipe	145	(4) ALP 9212-N w/ Mount Pipe	126
SLCP 2x6014 w/ Mount Pipe	145	Platform Mount [LP 601-1]	126
BXA-171063-8BF-2 w/ Mount Pipe	145	(4) ALP 9212-N w/ Mount Pipe	126
(2) FD9R6004/2C-3L	145	RR90-17-02DPL2 w/ Mount Pipe	116
(2) SC-E 6014 rev2 w/ Mount Pipe	145	APX16DWV-16DWV-S-E-A20 w/Mount Pipe	116
SLCP 2x6014 w/ Mount Pipe	145	ATMAA1412D-1A20	116
BXA-171063-8BF-2 w/ Mount Pipe	145	ATMPP1412D-1CWA	116
BXA-70063-6CF-EDIN-6 w/ Mount Pipe	145	Platform Mount [LP 601-1]	116
(2) LPA-80063/6CF w/ Mount Pipe	145	RR90-17-02DPL2 w/ Mount Pipe	116
(2) FD9R6004/2C-3L	145	APX16DWV-16DWV-S-E-A20 w/Mount Pipe	116
Platform Mount [LP 1001-1]	145	ATMAA1412D-1A20	116
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	136	ATMPP1412D-1CWA	116
(2) DUO1417-8686 w/ Mount Pipe	136	RR90-17-02DPL2 w/ Mount Pipe	116
7770.00 w/ Mount Pipe	136	APX16DWV-16DWV-S-E-A20 w/Mount Pipe	116
(2) LGP13519	136	ATMAA1412D-1A20	116
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	136	ATMPP1412D-1CWA	116
(2) DUO1417-8686 w/ Mount Pipe	136	Side Arm Mount [SO 701-1]	95
7770.00 w/ Mount Pipe	136	4' ICE SHIELDS	95
(2) LGP13519	136	Side Arm Mount [SO 701-1]	95
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	136	RR65-18-02DP w/ Mount Pipe	95
(2) DUO1417-8686 w/ Mount Pipe	136	DA1900-39	95
7770.00 w/ Mount Pipe	136	7250.02 w/ Mount Pipe	87
(2) LGP13519	136	7250.02 w/ Mount Pipe	87
Platform Mount [LP 1001-1]	136	7250.02 w/ Mount Pipe	87

MATERIAL STRENGTH

GRADE	Fy	Fu	GRADE	Fy	Fu
A572-65	65 ksi	80 ksi			

TOWER DESIGN NOTES

1. Tower is located in Hartford County, Connecticut.
2. Tower designed for a 80 mph basic wind in accordance with the TIA/EIA-222-F Standard.
3. Tower is also designed for a 38 mph basic wind with 1.00 in ice. Ice is considered to increase in thickness with height.
4. Deflections are based upon a 50 mph wind.
5. TOWER RATING: 67.9%

Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 We Are Solutions Phone: (724) 416 2000 FAX:		Job: BU 806368 Project: Client: Crown Castle Drawn by: gsingh App'd: Code: TIA/EIA-222-F Date: 09/30/11 Scale: NTS Path: R:\ISA Models - Letters\Work Area\CTHompson\806368\806368.dwg Dwg No. E-1	
--	--	--	--

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	1 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Tower Input Data

There is a pole section.

This tower is designed using the TIA/EIA-222-F standard.

The following design criteria apply:

Tower is located in Hartford County, Connecticut.

Basic wind speed of 80 mph.

Nominal ice thickness of 1.000 in.

Ice thickness is considered to increase with height.

Ice density of 56.000 pcf.

A wind speed of 38 mph is used in combination with ice.

Temperature drop of 50.000 °F.

Deflections calculated using a wind speed of 50 mph.

A non-linear (P-delta) analysis was used.

Pressures are calculated at each section.

Stress ratio used in pole design is 1.333.

Local bending stresses due to climbing loads, feedline supports, and appurtenance mounts are not considered.

Options

Consider Moments - Legs	Distribute Leg Loads As Uniform	Treat Feedline Bundles As Cylinder
Consider Moments - Horizontals	Assume Legs Pinned	Use ASCE 10 X-Brace Ly Rules
Consider Moments - Diagonals	✓ Assume Rigid Index Plate	Calculate Redundant Bracing Forces
Use Moment Magnification	✓ Use Clear Spans For Wind Area	Ignore Redundant Members in FEA
✓ Use Code Stress Ratios	Use Clear Spans For KL/r	SR Leg Bolts Resist Compression
✓ Use Code Safety Factors - Guys	Retension Guys To Initial Tension	All Leg Panels Have Same Allowable
✓ Escalate Ice	✓ Bypass Mast Stability Checks	Offset Girt At Foundation
Always Use Max Kz	✓ Use Azimuth Dish Coefficients	Consider Feedline Torque
Use Special Wind Profile	✓ Project Wind Area of Appurt.	Include Angle Block Shear Check
Include Bolts In Member Capacity	Autocalc Torque Arm Areas	Poles
Leg Bolts Are At Top Of Section	SR Members Have Cut Ends	✓ Include Shear-Torsion Interaction
Secondary Horizontal Braces Leg	Sort Capacity Reports By Component	Always Use Sub-Critical Flow
Use Diamond Inner Bracing (4 Sided)	Triangulate Diamond Inner Bracing	Use Top Mounted Sockets
Add IBC .6D+W Combination		

Tapered Pole Section Geometry

Section	Elevation	Section Length	Splice Length	Number of Sides	Top Diameter	Bottom Diameter	Wall Thickness	Bend Radius	Pole Grade
	ft	ft	ft		in	in	in	in	
L1	145.000-92.500	52.500	5.000	12	20.500	35.640	0.344	1.375	A572-65 (65 ksi)
L2	92.500-44.710	52.790	6.580	12	33.511	48.610	0.438	1.750	A572-65 (65 ksi)
L3	44.710-0.000	51.290		12	45.853	60.500	0.469	1.875	A572-65 (65 ksi)

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	2 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Tapered Pole Properties

Section	Tip Dia. in	Area in ²	I in ⁴	r in	C in	I/C in ³	J in ⁴	I/Q in ²	w in	w/t
L1	21.223	22.310	1156.948	7.216	10.619	108.951	2344.290	10.981	4.573	13.303
L2	36.897	39.069	6212.555	12.636	18.462	336.514	12588.320	19.228	8.630	25.106
L3	50.325	67.863	20100.989	17.246	25.180	798.293	40730.054	33.400	11.855	27.097
	62.634	90.610	41678.805	21.491	31.339	1329.934	84452.559	44.595	14.958	31.91

Tower Elevation	Gusset Area (per face)	Gusset Thickness	Gusset Grade	Adjust. Factor A _f	Adjust. Factor A _r	Weight Mult.	Double Angle Stitch Bolt Spacing Diagonals in	Double Angle Stitch Bolt Spacing Horizontals in
ft	ft ²	in						
L1 145.000-92.50 0				1	1	1		
L2 92.500-44.710				1	1	1		
L3 44.710-0.000				1	1	1		

Feed Line/Linear Appurtenances - Entered As Round Or Flat

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Total Number	Number Per Row	Clear Spacing in	Width or Diameter in	Perimeter in	Weight klf
**										

Feed Line/Linear Appurtenances - Entered As Area

Description	Face or Leg	Allow Shield	Component Type	Placement ft	Face Offset in	Lateral Offset (Frac FW)	#	C _A A _A ft ² /ft	Weight klf
*** Climbing Ladder (Flat)	C	No	CaAa (Out Of Face)	145.000 - 137.000	24.000	0	1	No Ice 0.584 1/2" Ice 1.030 1" Ice 1.476 2" Ice 2.368 4" Ice 4.151	0.005 0.007 0.010 0.020 0.049
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	137.000 - 128.000	24.000	0	1	No Ice 0.584 1/2" Ice 1.030 1" Ice 1.476 2" Ice 2.368 4" Ice 4.151	0.005 0.007 0.010 0.020 0.049
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	127.000 - 120.000	24.000	0	1	No Ice 0.584 1/2" Ice 1.030 1" Ice 1.476 2" Ice 2.368 4" Ice 4.151	0.005 0.007 0.010 0.020 0.049
Climbing Ladder (Flat)	B	No	CaAa (Out Of Face)	117.000 - 110.000	24.000	0	1	No Ice 0.584 1/2" Ice 1.030 1" Ice 1.476	0.005 0.007 0.010

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	4 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Feed Line/Linear Appurtenances Section Areas

Tower Section	Tower Elevation ft	Face	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L1	145.000-92.500	A	0.000	0.000	0.000	0.000	0.663
		B	0.000	0.000	0.000	14.216	0.460
		C	0.000	0.000	0.000	13.981	0.545
L2	92.500-44.710	A	0.000	0.000	0.000	0.000	0.604
		B	0.000	0.000	0.000	14.815	0.473
		C	0.000	0.000	0.000	18.925	0.863
L3	44.710-0.000	A	0.000	0.000	0.000	0.000	0.565
		B	0.000	0.000	0.000	13.860	0.443
		C	0.000	0.000	0.000	17.705	0.807

Feed Line/Linear Appurtenances Section Areas - With Ice

Tower Section	Tower Elevation ft	Face or Leg	Ice Thickness in	A_R ft ²	A_F ft ²	$C_A A_A$ In Face ft ²	$C_A A_A$ Out Face ft ²	Weight K
L1	145.000-92.500	A	1.164	0.000	0.000	0.000	0.000	0.663
		B		0.000	0.000	0.000	39.247	0.652
		C		0.000	0.000	0.000	33.222	1.255
L2	92.500-44.710	A	1.090	0.000	0.000	0.000	0.000	0.604
		B		0.000	0.000	0.000	37.061	1.050
		C		0.000	0.000	0.000	41.172	2.193
L3	44.710-0.000	A	1.000	0.000	0.000	0.000	0.000	0.565
		B		0.000	0.000	0.000	33.361	0.928
		C		0.000	0.000	0.000	37.207	1.932

Feed Line Center of Pressure

Section	Elevation ft	CP_X in	CP_Z in	CP_X Ice in	CP_Z Ice in
L1	145.000-92.500	-0.012	0.325	0.066	0.606
L2	92.500-44.710	-0.093	0.440	-0.073	0.805
L3	44.710-0.000	-0.097	0.458	-0.080	0.851

Discrete Tower Loads

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _{AA} A _A Front ft ²	C _{AA} A _A Side ft ²	Weight K	

(2) DUAL BAND 800/1900	A	From Leg	4.000	0.000	136.000	No Ice	1.549	0.809	0.027

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	5 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
FULL BAND MASTHEAD			0.000 4.000			1/2" Ice 1.718 1" Ice 1.896 2" Ice 2.277 4" Ice 3.143	0.943 1.085 1.396 2.122	0.038 0.052 0.086 0.189
(2) DUO1417-8686 w/ Mount Pipe	A	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 6.771 1/2" Ice 7.239 1" Ice 7.716 2" Ice 8.701 4" Ice 10.809	5.388 6.069 6.763 8.205 11.352	0.039 0.092 0.155 0.301 0.705
7770.00 w/ Mount Pipe	A	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 6.119 1/2" Ice 6.626 1" Ice 7.128 2" Ice 8.164 4" Ice 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.101 0.155 0.287 0.665
(2) LGP13519	A	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 0.338 1/2" Ice 0.422 1" Ice 0.515 2" Ice 0.726 4" Ice 1.252	0.207 0.280 0.362 0.551 1.034	0.005 0.008 0.012 0.024 0.071
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	B	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 1.549 1/2" Ice 1.718 1" Ice 1.896 2" Ice 2.277 4" Ice 3.143	0.809 0.943 1.085 1.396 2.122	0.027 0.038 0.052 0.086 0.189
(2) DUO1417-8686 w/ Mount Pipe	B	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 6.771 1/2" Ice 7.239 1" Ice 7.716 2" Ice 8.701 4" Ice 10.809	5.388 6.069 6.763 8.205 11.352	0.039 0.092 0.155 0.301 0.705
7770.00 w/ Mount Pipe	B	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 6.119 1/2" Ice 6.626 1" Ice 7.128 2" Ice 8.164 4" Ice 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.101 0.155 0.287 0.665
(2) LGP13519	B	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 0.338 1/2" Ice 0.422 1" Ice 0.515 2" Ice 0.726 4" Ice 1.252	0.207 0.280 0.362 0.551 1.034	0.005 0.008 0.012 0.024 0.071
(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	C	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 1.549 1/2" Ice 1.718 1" Ice 1.896 2" Ice 2.277 4" Ice 3.143	0.809 0.943 1.085 1.396 2.122	0.027 0.038 0.052 0.086 0.189
(2) DUO1417-8686 w/ Mount Pipe	C	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 6.771 1/2" Ice 7.239 1" Ice 7.716 2" Ice 8.701 4" Ice 10.809	5.388 6.069 6.763 8.205 11.352	0.039 0.092 0.155 0.301 0.705
7770.00 w/ Mount Pipe	C	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 6.119 1/2" Ice 6.626 1" Ice 7.128 2" Ice 8.164 4" Ice 10.360	4.254 5.014 5.711 7.155 10.412	0.055 0.101 0.155 0.287 0.665
(2) LGP13519	C	From Leg	4.000 0.000 4.000	0.000	136.000	No Ice 0.338 1/2" Ice 0.422 1" Ice 0.515	0.207 0.280 0.362	0.005 0.008 0.012

RISATower

Crown Castle
 2000 Corporate Drive
 Canonsburg, PA 15317
 Phone: (724) 416 2000
 FAX:

Job

BU 806368

Page

6 of 16

Project**Date**

10:09:06 09/30/11

Client

Crown Castle

Designed by

CThompson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft²	C _A A _A Side ft²	Weight K						
Platform Mount [LP 1001-1]	C	None		0.000	136.000	2" Ice	0.726	0.551	0.024						
						4" Ice	1.252	1.034	0.071						
						No Ice	47.700	47.700	3.017						
						1/2" Ice	59.500	59.500	3.621						
						1" Ice	71.300	71.300	4.225						
						2" Ice	94.900	94.900	5.433						
						4" Ice	142.100	142.100	7.849						

(4) ALP 9212-N w/ Mount Pipe	A	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice	6.021	7.050	0.037						
						1/2" Ice	6.505	7.833	0.094						
						1" Ice	6.992	8.588	0.161						
						2" Ice	7.995	10.151	0.317						
						4" Ice	10.128	13.500	0.746						
GPS	A	From Leg	4.000 0.000 4.000	0.000	126.000	No Ice	0.175	0.175	0.000						
						1/2" Ice	0.238	0.238	0.002						
						1" Ice	0.309	0.309	0.005						
						2" Ice	0.477	0.477	0.014						
						4" Ice	0.918	0.918	0.053						
(4) ALP 9212-N w/ Mount Pipe	B	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice	6.021	7.050	0.037						
						1/2" Ice	6.505	7.833	0.094						
						1" Ice	6.992	8.588	0.161						
						2" Ice	7.995	10.151	0.317						
						4" Ice	10.128	13.500	0.746						
GPS	B	From Leg	4.000 0.000 4.000	0.000	126.000	No Ice	0.175	0.175	0.000						
						1/2" Ice	0.238	0.238	0.002						
						1" Ice	0.309	0.309	0.005						
						2" Ice	0.477	0.477	0.014						
						4" Ice	0.918	0.918	0.053						
(4) ALP 9212-N w/ Mount Pipe	C	From Leg	4.000 0.000 2.000	0.000	126.000	No Ice	6.021	7.050	0.037						
						1/2" Ice	6.505	7.833	0.094						
						1" Ice	6.992	8.588	0.161						
						2" Ice	7.995	10.151	0.317						
						4" Ice	10.128	13.500	0.746						
Platform Mount [LP 601-1]	C	None		0.000	126.000	No Ice	28.470	28.470	1.122						
						1/2" Ice	33.590	33.590	1.514						
						1" Ice	38.710	38.710	1.905						
						2" Ice	48.950	48.950	2.689						
						4" Ice	69.430	69.430	4.255						

						RR90-17-02DPL2 w/ Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	116.000	No Ice	4.593	3.342	0.034
1/2" Ice	5.088	4.112	0.069												
1" Ice	5.578	4.808	0.114												
2" Ice	6.588	6.249	0.224												
4" Ice	8.731	9.332	0.558												
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	A	From Leg	4.000 0.000 1.000	0.000	116.000	No Ice	7.269	3.286	0.058						
						1/2" Ice	7.733	3.918	0.103						
						1" Ice	8.205	4.567	0.156						
						2" Ice	9.177	5.916	0.285						
						4" Ice	11.231	8.881	0.653						
ATMAA1412D-1A20	A	From Leg	4.000 0.000 1.000	0.000	116.000	No Ice	1.167	0.467	0.013						
						1/2" Ice	1.314	0.575	0.021						
						1" Ice	1.469	0.691	0.030						
						2" Ice	1.806	0.951	0.056						
						4" Ice	2.584	1.573	0.137						
ATMPP1412D-1CWA	A	From Leg	4.000 0.000 1.000	0.000	116.000	No Ice	1.167	0.416	0.013						
						1/2" Ice	1.317	0.530	0.020						
						1" Ice	1.476	0.652	0.028						

<i>RISATower</i> <i>Crown Castle</i> 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	7 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
RR90-17-02DPL2 w/ Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	1.820	0.923	0.052
						4" Ice	2.610	1.569	0.131
						No Ice	4.593	3.342	0.034
						1/2" Ice	5.088	4.112	0.069
						1" Ice	5.578	4.808	0.114
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	B	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	6.588	6.249	0.224
						4" Ice	8.731	9.332	0.558
						No Ice	7.269	3.286	0.058
						1/2" Ice	7.733	3.918	0.103
						1" Ice	8.205	4.567	0.156
ATMAA1412D-1A20	B	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	9.177	5.916	0.285
						4" Ice	11.231	8.881	0.653
						No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
ATMPP1412D-1CWA	B	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
						No Ice	1.167	0.416	0.013
						1/2" Ice	1.317	0.530	0.020
						1" Ice	1.476	0.652	0.028
RR90-17-02DPL2 w/ Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	1.820	0.923	0.052
						4" Ice	2.610	1.569	0.131
						No Ice	4.593	3.342	0.034
						1/2" Ice	5.088	4.112	0.069
						1" Ice	5.578	4.808	0.114
APX16DWV-16DWV-S-E-A 20 w/Mount Pipe	C	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	6.588	6.249	0.224
						4" Ice	8.731	9.332	0.558
						No Ice	7.269	3.286	0.058
						1/2" Ice	7.733	3.918	0.103
						1" Ice	8.205	4.567	0.156
ATMAA1412D-1A20	C	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	9.177	5.916	0.285
						4" Ice	11.231	8.881	0.653
						No Ice	1.167	0.467	0.013
						1/2" Ice	1.314	0.575	0.021
						1" Ice	1.469	0.691	0.030
ATMPP1412D-1CWA	C	From Leg	4.000 0.000 1.000	0.000	116.000	2" Ice	1.806	0.951	0.056
						4" Ice	2.584	1.573	0.137
						No Ice	1.167	0.416	0.013
						1/2" Ice	1.317	0.530	0.020
						1" Ice	1.476	0.652	0.028
Platform Mount [LP 601-1]	C	None		0.000	116.000	2" Ice	1.820	0.923	0.052
						4" Ice	2.610	1.569	0.131
						No Ice	28.470	28.470	1.122
						1/2" Ice	33.590	33.590	1.514
						1" Ice	38.710	38.710	1.905
*** RR65-18-02DP w/ Mount Pipe	B	From Leg	2.000 0.000 2.000	0.000	95.000	2" Ice	48.950	48.950	2.689
						4" Ice	69.430	69.430	4.255
						No Ice	4.593	3.319	0.034
						1/2" Ice	5.088	4.089	0.069
						1" Ice	5.578	4.784	0.114
Side Arm Mount [SO 701-1]	B	From Leg	1.000 0.000 0.000	0.000	95.000	2" Ice	6.588	6.225	0.224
						4" Ice	8.731	9.308	0.557
						No Ice	0.850	1.670	0.065
						1/2" Ice	1.140	2.340	0.079
						1" Ice	1.430	3.010	0.093
						2" Ice	2.010	4.350	0.121

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	8 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft		C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
Side Arm Mount [SO 701-1]	C	From Leg	1.000 0.000 0.000	0.000	95.000	4" Ice No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.170 0.850 1.140 1.430 2.010 3.170	7.030 1.670 2.340 3.010 4.350 7.030	0.177 0.065 0.079 0.093 0.121 0.177
4' ICE SHIELDS	C	From Leg	2.000 0.000 4.000	0.000	95.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	1.400 1.884 2.377 3.388 5.514	0.467 0.640 0.821 1.210 2.091	0.030 0.095 0.167 0.332 0.748

7250.02 w/ Mount Pipe	A	From Leg	1.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.236 4.710 5.166 6.106 8.321	3.324 4.302 5.050 6.597 9.890	0.038 0.071 0.114 0.223 0.558
7250.02 w/ Mount Pipe	B	From Leg	1.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.236 4.710 5.166 6.106 8.321	3.324 4.302 5.050 6.597 9.890	0.038 0.071 0.114 0.223 0.558
7250.02 w/ Mount Pipe	C	From Leg	1.000 0.000 0.000	0.000	87.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	4.236 4.710 5.166 6.106 8.321	3.324 4.302 5.050 6.597 9.890	0.038 0.071 0.114 0.223 0.558
**									
GPS	A	From Leg	4.000 0.000 5.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.175 0.238 0.309 0.477 0.918	0.175 0.238 0.309 0.477 0.918	0.000 0.002 0.005 0.014 0.053
BXA-171063-8BF-2 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.179 3.555 3.964 4.853 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.059 0.098 0.193 0.487
(2) FD9R6004/2C-3L	A	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	0.367 0.451 0.543 0.755 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
(2) SC-E 6014 rev2 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	3.783 4.182 4.591 5.442 7.293	4.396 5.009 5.640 6.956 9.897	0.032 0.069 0.115 0.224 0.544
SLCP 2x6014 w/ Mount Pipe	A	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice 4" Ice	7.451 7.961 8.470 9.519 11.742	6.955 7.756 8.520 10.100 13.475	0.040 0.102 0.175 0.343 0.799
BXA-171063-8BF-2 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 1/2" Ice 1" Ice 2" Ice	3.179 3.555 3.964 4.853	3.353 3.971 4.595 5.893	0.029 0.059 0.098 0.193

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	9 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Description	Face or Leg	Offset Type	Offsets: Horz Lateral Vert ft ft ft	Azimuth Adjustment °	Placement ft	C _A A _A Front ft ²	C _A A _A Side ft ²	Weight K
(2) FD9R6004/2C-3L	B	From Leg	4.000 0.000 3.000	0.000	145.000	4" Ice 6.767 No Ice 0.367 1/2" Ice 0.451 1" Ice 0.543 2" Ice 0.755 4" Ice 1.281	8.885 0.085 0.136 0.196 0.343 0.740	0.487 0.003 0.005 0.009 0.020 0.063
(2) SC-E 6014 rev2 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 3.783 1/2" Ice 4.182 1" Ice 4.591 2" Ice 5.442 4" Ice 7.293	4.396 5.009 5.640 6.956 9.897	0.032 0.069 0.115 0.224 0.544
SLCP 2x6014 w/ Mount Pipe	B	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 7.451 1/2" Ice 7.961 1" Ice 8.470 2" Ice 9.519 4" Ice 11.742	6.955 7.756 8.520 10.100 13.475	0.040 0.102 0.175 0.343 0.799
BXA-171063-8BF-2 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 3.179 1/2" Ice 3.555 1" Ice 3.964 2" Ice 4.853 4" Ice 6.767	3.353 3.971 4.595 5.893 8.885	0.029 0.059 0.098 0.193 0.487
BXA-70063-6CF-EDIN-6 w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 7.969 1/2" Ice 8.609 1" Ice 9.216 2" Ice 10.459 4" Ice 13.066	5.801 6.953 7.819 9.601 13.366	0.042 0.100 0.170 0.335 0.803
(2) LPA-80063/6CF w/ Mount Pipe	C	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 10.577 1/2" Ice 11.241 1" Ice 11.872 2" Ice 13.163 4" Ice 15.866	10.671 11.932 12.911 14.921 19.158	0.052 0.142 0.244 0.476 1.088
(2) FD9R6004/2C-3L	C	From Leg	4.000 0.000 3.000	0.000	145.000	No Ice 0.367 1/2" Ice 0.451 1" Ice 0.543 2" Ice 0.755 4" Ice 1.281	0.085 0.136 0.196 0.343 0.740	0.003 0.005 0.009 0.020 0.063
Platform Mount [LP 1001-1]	C	None		0.000	145.000	No Ice 47.700 1/2" Ice 59.500 1" Ice 71.300 2" Ice 94.900 4" Ice 142.100	47.700 59.500 71.300 94.900 142.100	3.017 3.621 4.225 5.433 7.849
**								

Dishes

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K
DA1900-39	C	Paraboloid	From	2.000	15.000		95.000	3.542	No Ice 9.860	0.045

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	10 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Description	Face or Leg	Dish Type	Offset Type	Offsets: Horz Lateral Vert ft	Azimuth Adjustment °	3 dB Beam Width °	Elevation ft	Outside Diameter ft	Aperture Area ft ²	Weight K	
		w/Shroud (HP)	Leg	0.000 1.000					1/2" Ice 1" Ice 2" Ice 4" Ice	10.315 10.771 11.682 13.503	0.098 0.151 0.257 0.469
**											

Load Combinations

Comb. No.	Description
1	Dead Only
2	Dead+Wind 0 deg - No Ice
3	Dead+Wind 30 deg - No Ice
4	Dead+Wind 60 deg - No Ice
5	Dead+Wind 90 deg - No Ice
6	Dead+Wind 120 deg - No Ice
7	Dead+Wind 150 deg - No Ice
8	Dead+Wind 180 deg - No Ice
9	Dead+Wind 210 deg - No Ice
10	Dead+Wind 240 deg - No Ice
11	Dead+Wind 270 deg - No Ice
12	Dead+Wind 300 deg - No Ice
13	Dead+Wind 330 deg - No Ice
14	Dead+Ice+Temp
15	Dead+Wind 0 deg+Ice+Temp
16	Dead+Wind 30 deg+Ice+Temp
17	Dead+Wind 60 deg+Ice+Temp
18	Dead+Wind 90 deg+Ice+Temp
19	Dead+Wind 120 deg+Ice+Temp
20	Dead+Wind 150 deg+Ice+Temp
21	Dead+Wind 180 deg+Ice+Temp
22	Dead+Wind 210 deg+Ice+Temp
23	Dead+Wind 240 deg+Ice+Temp
24	Dead+Wind 270 deg+Ice+Temp
25	Dead+Wind 300 deg+Ice+Temp
26	Dead+Wind 330 deg+Ice+Temp
27	Dead+Wind 0 deg - Service
28	Dead+Wind 30 deg - Service
29	Dead+Wind 60 deg - Service
30	Dead+Wind 90 deg - Service
31	Dead+Wind 120 deg - Service
32	Dead+Wind 150 deg - Service
33	Dead+Wind 180 deg - Service
34	Dead+Wind 210 deg - Service
35	Dead+Wind 240 deg - Service
36	Dead+Wind 270 deg - Service
37	Dead+Wind 300 deg - Service
38	Dead+Wind 330 deg - Service

Maximum Member Forces

RISATower

Crown Castle
 2000 Corporate Drive
 Canonsburg, PA 15317
 Phone: (724) 416 2000
 FAX:

Job

BU 806368

Page

11 of 16

Project**Date**

10:09:06 09/30/11

Client

Crown Castle

Designed by

CThompson

Section No.	Elevation ft	Component Type	Condition	Gov. Load Comb.	Force K	Major Axis Moment kip-ft	Minor Axis Moment kip-ft
L1	145 - 92.5	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-29.782	1.976	-1.484
			Max. Mx	11	-15.355	759.378	-2.884
			Max. My	8	-15.364	2.850	-756.345
			Max. Vy	5	22.573	-758.958	2.379
			Max. Vx	8	22.510	2.850	-756.345
			Max. Torque	7			-2.381
L2	92.5 - 44.71	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-46.763	3.953	-4.390
			Max. Mx	5	-27.365	-1998.964	7.186
			Max. My	8	-27.378	10.084	-1984.033
			Max. Vy	5	30.223	-1998.964	7.186
			Max. Vx	8	29.932	10.084	-1984.033
			Max. Torque	13			3.437
L3	44.71 - 0	Pole	Max Tension	1	0.000	0.000	0.000
			Max. Compression	14	-70.017	5.642	-6.821
			Max. Mx	5	-45.530	-3727.360	12.817
			Max. My	8	-45.530	18.072	-3698.267
			Max. Vy	5	37.233	-3727.360	12.817
			Max. Vx	8	36.947	18.072	-3698.267
			Max. Torque	13			3.633

Maximum Reactions

Location	Condition	Gov. Load Comb.	Vertical K	Horizontal, X K	Horizontal, Z K
Pole	Max. Vert	24	70.017	10.757	-0.021
	Max. H _x	11	45.549	37.110	-0.095
	Max. H _z	2	45.549	-0.163	36.913
	Max. M _x	2	3694.702	-0.163	36.913
	Max. M _z	5	3727.360	-37.209	0.116
	Max. Torsion	13	3.633	18.547	31.902
	Min. Vert	1	45.549	0.000	0.000
	Min. H _x	5	45.549	-37.209	0.116
	Min. H _z	8	45.549	0.148	-36.923
	Min. M _x	8	-3698.267	0.148	-36.923
	Min. M _z	11	-3719.418	37.110	-0.095
	Min. Torsion	7	-3.518	-18.555	-31.886

Tower Mast Reaction Summary

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead Only	45.549	0.000	0.000	1.244	0.820	0.000
Dead+Wind 0 deg - No Ice	45.549	0.163	-36.913	-3694.702	-17.846	-2.345
Dead+Wind 30 deg - No Ice	45.549	18.785	-31.998	-3203.944	-1883.292	-0.398
Dead+Wind 60 deg - No Ice	45.549	32.282	-18.547	-1857.922	-3234.916	1.284
Dead+Wind 90 deg - No Ice	45.549	37.209	-0.116	-12.817	-3727.360	2.710
Dead+Wind 120 deg - No Ice	45.549	32.230	18.298	1831.366	-3227.169	3.462
Dead+Wind 150 deg - No Ice	45.549	18.555	31.886	3192.756	-1856.037	3.518
Dead+Wind 180 deg - No Ice	45.549	-0.148	36.923	3698.267	18.072	2.502

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	12 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Load Combination	Vertical K	Shear _x K	Shear _z K	Overturning Moment, M _x kip-ft	Overturning Moment, M _z kip-ft	Torque kip-ft
Dead+Wind 210 deg - No Ice	45.549	-18.706	31.969	3203.651	1877.310	0.618
Dead+Wind 240 deg - No Ice	45.549	-32.186	18.516	1857.456	3227.231	-1.125
Dead+Wind 270 deg - No Ice	45.549	-37.110	0.095	13.294	3719.418	-2.711
Dead+Wind 300 deg - No Ice	45.549	-32.148	-18.312	-1830.183	3220.781	-3.534
Dead+Wind 330 deg - No Ice	45.549	-18.547	-31.902	-3191.801	1856.957	-3.633
Dead+Ice+Temp	70.017	-0.000	0.000	6.821	5.642	0.000
Dead+Wind 0 deg+Ice+Temp	70.017	0.038	-10.723	-1112.957	1.663	-0.616
Dead+Wind 30 deg+Ice+Temp	70.017	5.433	-9.293	-963.752	-561.784	0.001
Dead+Wind 60 deg+Ice+Temp	70.017	9.349	-5.382	-555.322	-970.939	0.527
Dead+Wind 90 deg+Ice+Temp	70.017	10.781	-0.026	3.996	-1120.324	0.934
Dead+Wind 120 deg+Ice+Temp	70.017	9.339	5.324	562.935	-969.559	1.101
Dead+Wind 150 deg+Ice+Temp	70.017	5.380	9.267	974.770	-555.969	1.030
Dead+Wind 180 deg+Ice+Temp	70.017	-0.034	10.725	1127.092	9.473	0.651
Dead+Wind 210 deg+Ice+Temp	70.017	-5.413	9.286	976.928	571.378	0.051
Dead+Wind 240 deg+Ice+Temp	70.017	-9.326	5.374	568.457	980.109	-0.487
Dead+Wind 270 deg+Ice+Temp	70.017	-10.757	0.021	9.376	1129.429	-0.930
Dead+Wind 300 deg+Ice+Temp	70.017	-9.319	-5.328	-549.387	979.052	-1.116
Dead+Wind 330 deg+Ice+Temp	70.017	-5.378	-9.271	-961.280	567.277	-1.059
Dead+Wind 0 deg - Service	45.549	0.064	-14.419	-1443.257	-6.457	-0.922
Dead+Wind 30 deg - Service	45.549	7.338	-12.499	-1251.456	-735.554	-0.158
Dead+Wind 60 deg - Service	45.549	12.610	-7.245	-725.375	-1263.832	0.504
Dead+Wind 90 deg - Service	45.549	14.535	-0.045	-4.226	-1456.299	1.064
Dead+Wind 120 deg - Service	45.549	12.590	7.148	716.559	-1260.793	1.359
Dead+Wind 150 deg - Service	45.549	7.248	12.455	1248.639	-724.894	1.379
Dead+Wind 180 deg - Service	45.549	-0.058	14.423	1446.215	7.580	0.980
Dead+Wind 210 deg - Service	45.549	-7.307	12.488	1252.904	734.247	0.242
Dead+Wind 240 deg - Service	45.549	-12.573	7.233	726.757	1261.857	-0.440
Dead+Wind 270 deg - Service	45.549	-14.496	0.037	5.980	1454.223	-1.061
Dead+Wind 300 deg - Service	45.549	-12.558	-7.153	-714.526	1259.329	-1.385
Dead+Wind 330 deg - Service	45.549	-7.245	-12.462	-1246.699	726.289	-1.426

Solution Summary

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
1	0.000	-45.549	0.000	0.000	45.549	0.000	0.000%
2	0.163	-45.549	-36.913	-0.163	45.549	36.913	0.000%
3	18.785	-45.549	-31.998	-18.785	45.549	31.998	0.000%
4	32.282	-45.549	-18.547	-32.282	45.549	18.547	0.000%
5	37.209	-45.549	-0.116	-37.209	45.549	0.116	0.000%
6	32.230	-45.549	18.298	-32.230	45.549	-18.298	0.000%
7	18.555	-45.549	31.886	-18.555	45.549	-31.886	0.000%
8	-0.148	-45.549	36.923	0.148	45.549	-36.923	0.000%
9	-18.706	-45.549	31.969	18.706	45.549	-31.969	0.000%
10	-32.186	-45.549	18.516	32.186	45.549	-18.516	0.000%
11	-37.110	-45.549	0.095	37.110	45.549	-0.095	0.000%
12	-32.148	-45.549	-18.312	32.148	45.549	18.312	0.000%
13	-18.547	-45.549	-31.902	18.547	45.549	31.902	0.000%
14	0.000	-70.017	0.000	0.000	70.017	-0.000	0.000%
15	0.038	-70.017	-10.723	-0.038	70.017	10.723	0.000%
16	5.433	-70.017	-9.293	-5.433	70.017	9.293	0.000%
17	9.349	-70.017	-5.382	-9.349	70.017	5.382	0.000%
18	10.781	-70.017	-0.026	-10.781	70.017	0.026	0.000%
19	9.339	-70.017	5.324	-9.339	70.017	-5.324	0.000%
20	5.380	-70.017	9.267	-5.380	70.017	-9.267	0.000%
21	-0.034	-70.017	10.725	0.034	70.017	-10.725	0.000%
22	-5.413	-70.017	9.286	5.413	70.017	-9.286	0.000%

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	13 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Load Comb.	Sum of Applied Forces			Sum of Reactions			% Error
	PX K	PY K	PZ K	PX K	PY K	PZ K	
23	-9.326	-70.017	5.374	9.326	70.017	-5.374	0.000%
24	-10.757	-70.017	0.021	10.757	70.017	-0.021	0.000%
25	-9.319	-70.017	-5.328	9.319	70.017	5.328	0.000%
26	-5.378	-70.017	-9.271	5.378	70.017	9.271	0.000%
27	0.064	-45.549	-14.419	-0.064	45.549	14.419	0.000%
28	7.338	-45.549	-12.499	-7.338	45.549	12.499	0.000%
29	12.610	-45.549	-7.245	-12.610	45.549	7.245	0.000%
30	14.535	-45.549	-0.045	-14.535	45.549	0.045	0.000%
31	12.590	-45.549	7.148	-12.590	45.549	-7.148	0.000%
32	7.248	-45.549	12.455	-7.248	45.549	-12.455	0.000%
33	-0.058	-45.549	14.423	0.058	45.549	-14.423	0.000%
34	-7.307	-45.549	12.488	7.307	45.549	-12.488	0.000%
35	-12.573	-45.549	7.233	12.573	45.549	-7.233	0.000%
36	-14.496	-45.549	0.037	14.496	45.549	-0.037	0.000%
37	-12.558	-45.549	-7.153	12.558	45.549	7.153	0.000%
38	-7.245	-45.549	-12.462	7.245	45.549	12.462	0.000%

Non-Linear Convergence Results

Load Combination	Converged?	Number of Cycles	Displacement Tolerance	Force Tolerance
1	Yes	4	0.00000001	0.00000001
2	Yes	4	0.00000001	0.00019035
3	Yes	5	0.00000001	0.00006802
4	Yes	5	0.00000001	0.00006772
5	Yes	4	0.00000001	0.00018052
6	Yes	5	0.00000001	0.00007277
7	Yes	5	0.00000001	0.00006366
8	Yes	4	0.00000001	0.00025148
9	Yes	5	0.00000001	0.00007038
10	Yes	5	0.00000001	0.00006992
11	Yes	4	0.00000001	0.00022013
12	Yes	5	0.00000001	0.00006345
13	Yes	5	0.00000001	0.00007327
14	Yes	4	0.00000001	0.00000992
15	Yes	4	0.00000001	0.00090692
16	Yes	5	0.00000001	0.00006187
17	Yes	5	0.00000001	0.00006187
18	Yes	4	0.00000001	0.00091139
19	Yes	5	0.00000001	0.00006292
20	Yes	5	0.00000001	0.00006220
21	Yes	4	0.00000001	0.00092102
22	Yes	5	0.00000001	0.00006359
23	Yes	5	0.00000001	0.00006366
24	Yes	4	0.00000001	0.00092349
25	Yes	5	0.00000001	0.00006221
26	Yes	5	0.00000001	0.00006283
27	Yes	4	0.00000001	0.00004701
28	Yes	4	0.00000001	0.00019836
29	Yes	4	0.00000001	0.00019734
30	Yes	4	0.00000001	0.00004458
31	Yes	4	0.00000001	0.00023443
32	Yes	4	0.00000001	0.00017973
33	Yes	4	0.00000001	0.00005307
34	Yes	4	0.00000001	0.00021394
35	Yes	4	0.00000001	0.00021162

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	14 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

36	Yes	4	0.00000001	0.00004757
37	Yes	4	0.00000001	0.00017864
38	Yes	4	0.00000001	0.00023703

Maximum Tower Deflections - Service Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 92.5	24.891	35	1.575	0.009
L2	97.5 - 44.71	10.953	29	1.106	0.003
L3	51.29 - 0	2.928	29	0.531	0.001

Critical Deflections and Radius of Curvature - Service Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.000	GPS	35	24.891	1.575	0.009	36426
136.000	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	35	22.035	1.493	0.008	20237
126.000	(4) ALP 9212-N w/ Mount Pipe	35	18.919	1.401	0.006	9585
116.000	RR90-17-02DPL2 w/ Mount Pipe	35	15.930	1.304	0.005	6279
96.000	DA1900-39	29	10.591	1.089	0.003	3870
95.000	RR65-18-02DP w/ Mount Pipe	29	10.354	1.077	0.003	3861
87.000	7250.02 w/ Mount Pipe	29	8.566	0.980	0.002	3914

Maximum Tower Deflections - Design Wind

Section No.	Elevation ft	Horz. Deflection in	Gov. Load Comb.	Tilt °	Twist °
L1	145 - 92.5	63.622	4	4.022	0.023
L2	97.5 - 44.71	28.027	4	2.830	0.007
L3	51.29 - 0	7.495	4	1.359	0.002

Critical Deflections and Radius of Curvature - Design Wind

Elevation ft	Appurtenance	Gov. Load Comb.	Deflection in	Tilt °	Twist °	Radius of Curvature ft
145.000	GPS	4	63.622	4.022	0.024	14385
136.000	(2) DUAL BAND 800/1900 FULL BAND MASTHEAD	4	56.330	3.815	0.020	7991
126.000	(4) ALP 9212-N w/ Mount Pipe	4	48.377	3.580	0.016	3784
116.000	RR90-17-02DPL2 w/ Mount Pipe	4	40.743	3.334	0.012	2477
96.000	DA1900-39	4	27.102	2.786	0.007	1524

RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page 15 of 16
	Project		Date 10:09:06 09/30/11
	Client	Crown Castle	Designed by CThompson

Elevation	Appurtenance	Gov. Load Comb.	Deflection	Tilt	Twist	Radius of Curvature
ft			in	°	°	ft
95.000	RR65-18-02DP w/ Mount Pipe	4	26.494	2.756	0.007	1521
87.000	7250.02 w/ Mount Pipe	4	21.920	2.509	0.005	1539

Compression Checks

Pole Design Data

Section No.	Elevation ft	Size	L ft	L _u ft	Kl/r	F _a ksi	A in ²	Actual P K	Allow. P _a K	Ratio P P _a
L1	145 - 92.5 (1)	TP35.64x20.5x0.344	52.500	0.000	0.0	39.000	37.472	-15.352	1461.430	0.011
L2	92.5 - 44.71 (2)	TP48.61x33.511x0.438	52.790	0.000	0.0	39.000	65.212	-27.364	2543.250	0.011
L3	44.71 - 0 (3)	TP60.5x45.853x0.469	51.290	0.000	0.0	37.783	90.610	-45.529	3423.470	0.013

Pole Bending Design Data

Section No.	Elevation ft	Size	Actual M _x kip-ft	Actual f _{bx} ksi	Allow. F _{bx} ksi	Ratio $\frac{f_{bx}}{F_{bx}}$	Actual M _y kip-ft	Actual f _{by} ksi	Allow. F _{by} ksi	Ratio $\frac{f_{by}}{F_{by}}$
L1	145 - 92.5 (1)	TP35.64x20.5x0.344	760.972	29.509	39.000	0.757	0.000	0.000	39.000	0.000
L2	92.5 - 44.71 (2)	TP48.61x33.511x0.438	2001.13	32.589	39.000	0.836	0.000	0.000	39.000	0.000
L3	44.71 - 0 (3)	TP60.5x45.853x0.469	3730.49 2	33.660	37.783	0.891	0.000	0.000	37.783	0.000

Pole Shear Design Data

Section No.	Elevation ft	Size	Actual V K	Actual f _v ksi	Allow. F _v ksi	Ratio $\frac{f_v}{F_v}$	Actual T kip-ft	Actual f _{vt} ksi	Allow. F _{vt} ksi	Ratio $\frac{f_{vt}}{F_{vt}}$
L1	145 - 92.5 (1)	TP35.64x20.5x0.344	22.602	0.603	26.000	0.047	0.093	0.002	26.000	0.000
L2	92.5 - 44.71 (2)	TP48.61x33.511x0.438	30.245	0.464	26.000	0.036	1.064	0.008	26.000	0.000
L3	44.71 - 0 (3)	TP60.5x45.853x0.469	37.254	0.411	26.000	0.032	1.284	0.005	26.000	0.000

Pole Interaction Design Data

Section No.	Elevation ft	Ratio P	Ratio f _{bx}	Ratio f _{by}	Ratio f _v	Ratio f _{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L1	145 - 92.5 (1)	0.011	0.757	0.000	0.047	0.000	0.768	1.333	H1-3+VT ✓

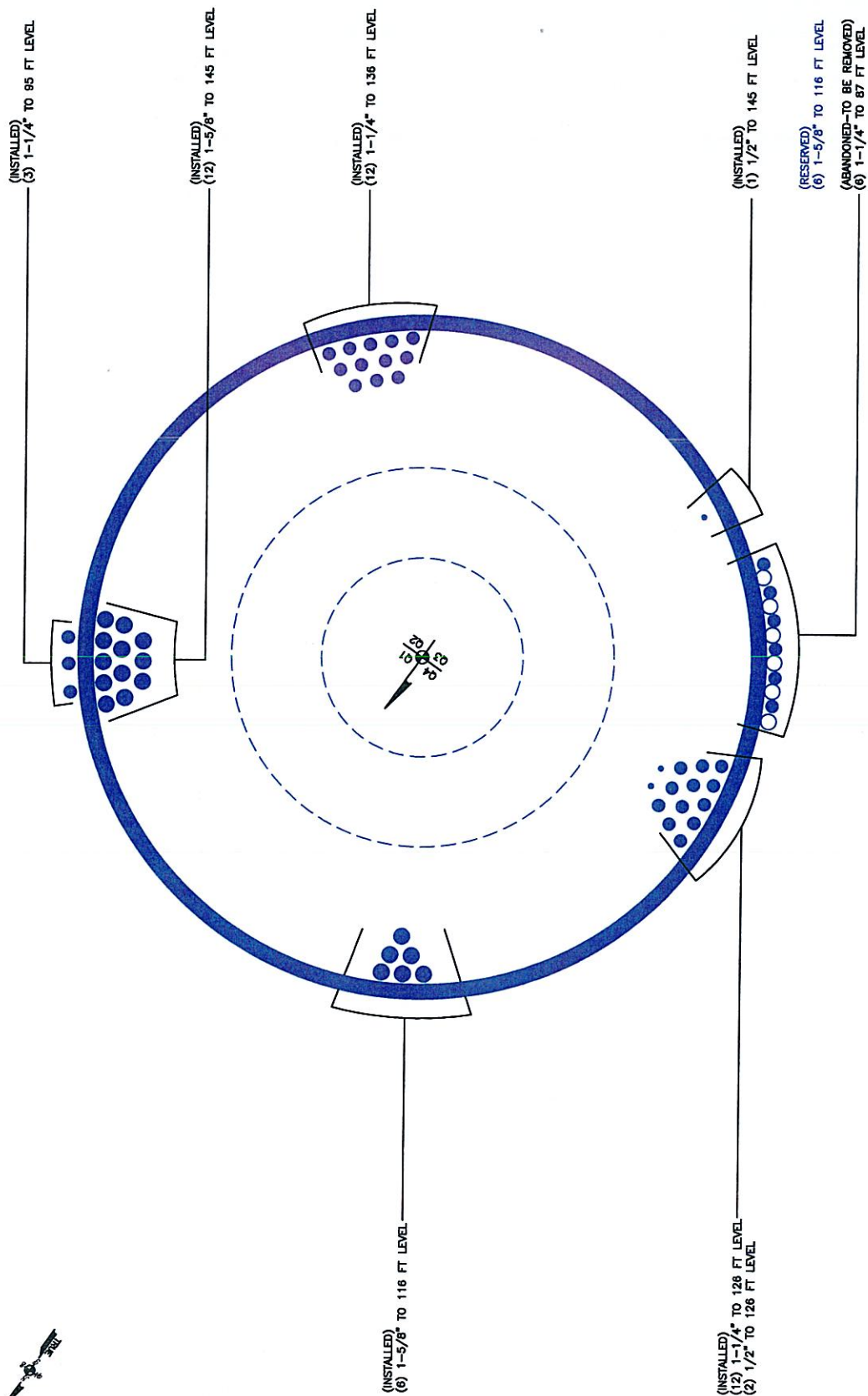
RISATower Crown Castle 2000 Corporate Drive Canonsburg, PA 15317 Phone: (724) 416 2000 FAX:	Job	BU 806368	Page	16 of 16
	Project		Date	10:09:06 09/30/11
	Client	Crown Castle	Designed by	CThompson

Section No.	Elevation ft	Ratio P P_a	Ratio f_{bx} F_{bx}	Ratio f_{by} F_{by}	Ratio f_v F_v	Ratio f_{vt} F_{vt}	Comb. Stress Ratio	Allow. Stress Ratio	Criteria
L2	92.5 - 44.71 (2)	0.011	0.836	0.000	0.036	0.000	0.847 ✓	1.333	H1-3+VT ✓
L3	44.71 - 0 (3)	0.013	0.891	0.000	0.032	0.000	0.904 ✓	1.333	H1-3+VT ✓

Section Capacity Table

Section No.	Elevation ft	Component Type	Size	Critical Element	P K	SF* P_{allow} K	% Capacity	Pass Fail
L1	145 - 92.5	Pole	TP35.64x20.5x0.344	1	-15.352	1948.086	57.6	Pass
L2	92.5 - 44.71	Pole	TP48.61x33.511x0.438	2	-27.364	3390.152	63.5	Pass
L3	44.71 - 0	Pole	TP60.5x45.853x0.469	3	-45.529	4563.485	67.9	Pass
							Summary	
							Pole (L3)	67.9 Pass
							RATING =	67.9 Pass

APPENDIX B
BASE LEVEL DRAWING



: SCALE :

APPENDIX C

ADDITIONAL CALCULATIONS

Stiffened or Unstiffened, UngROUTed, Circular Base Plate - Any Rod Material

TIA Rev F

Site Data

BU#: 806368

Site Name: HRT 049B 943215

App #: 131495 Rev 0

Pole Manufacturer: Other

Reactions

Moment:	3730	ft-kips
Axial:	46	kips
Shear:	37	kips

Anchor Rod Data

Qty:	20	
Diam:	2.25	in
Rod Material:	A615-J	
Strength (Fu):	100	ksi
Yield (Fy):	75	ksi
Bolt Circle:	70	in

If No stiffeners, Criteria: AISC ASD <-Only Applicable to Unstiffened Cases

Anchor Rod Results

Maximum Rod Tension:	125.6 Kips
Allowable Tension:	195.0 Kips
Anchor Rod Stress Ratio:	64.4% Pass

Rigid

Service, ASD
Fty*ASIF

Plate Data

Diam:	76.5	in
Thick:	2.25	in
Grade:	60	ksi
Single-Rod B-eff:	9.73	in

Base Plate Results

Base Plate Stress:	46.2 ksi
Allowable Plate Stress:	60.0 ksi
Base Plate Stress Ratio:	76.9% Pass

Flexural Check

Rigid

Service ASD
0.75*Fy*ASIF
Y.L. Length:
35.21

Stiffener Data (Welding at both sides)

Config:	0	*
Weld Type:		
Groove Depth:		in **
Groove Angle:		degrees
Fillet H. Weld:		<-- Disregard
Fillet V. Weld:		in
Width:		in
Height:		in
Thick:		in
Notch:		in
Grade:		ksi
Weld str.:		ksi

n/a

Stiffener Results

Horizontal Weld :	n/a
Vertical Weld:	n/a
Plate Flex+Shear, fb/Fb+(fv/Fv)^2:	n/a
Plate Tension+Shear, ft/Ft+(fv/Fv)^2:	n/a
Plate Comp. (AISC Bracket):	n/a

Pole Results

Pole Punching Shear Check:	n/a
----------------------------	-----

Pole Data

Diam:	60.5	in
Thick:	0.46875	in
Grade:	65	ksi
# of Sides:	12	"0" IF Round
Fu	80	ksi
Reinf. Fillet Weld	0	"0" if None

Stress Increase Factor

ASIF: 1.333

* 0 = none, 1 = every bolt, 2 = every 2 bolts, 3 = 2 per bolt

** Note: for complete joint penetration groove welds the groove depth must be exactly 1/2 the stiffener thickness for calculation purposes



FOUNDATION REACTION COMPARISON

BU# 806368
WO# 440146

REACTIONS	DESIGN REACTIONS	CURRENT REACTIONS	% CAPACITY
MOMENT (kip-ft)	5001.4	3730.0	74.6%
SHEAR (kips)	46.6	37.0	79.4%

Although the shear capacity is at 79.4%, a pad and pier foundation is controlled by moment and therefore the foundation rating is 74.6%.

Design loads from: Doc# 262188